



Teradata Database

Release Definition

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Introduction

Audience

This document is intended for Teradata customers, field engineers, and support staff.

Revision History

Date	Release	Description
October 2017	Teradata Database 16.10	<ul style="list-style-type: none">• Changed TaYS URL to https://access.teradata.com.• Revised license tiers information in Default Feature Status
June 2017	Teradata Database 16.10	<ul style="list-style-type: none">• Added information about Packageless TeraGSS.<ul style="list-style-type: none">◦ Updated <i>Changes to the TeraGSS Configuration</i> section.• Added information about the changes caused by the Teradata Database MAPS architecture (MAPS).<ul style="list-style-type: none">◦ Legacy vs. Dedicated Fallback information for Teradata Database MAPS architecture.◦ MAPS impact on Teradata Archive/Recovery Utility.• Teradata Unity now uses TDGSS instead of TeraGSS.• Added TDWM.TDWMActiveWDS uses the non-protected buffer.
December 2016	Teradata Database 16.00	<ul style="list-style-type: none">• Initial release.

Supported Software Releases and Operating Systems

This book supports Teradata® Database 16.10.

Teradata Database 16.10 is supported on:

- SUSE Linux Enterprise Server (SLES) 11 SP1
- SUSE Linux Enterprise Server (SLES) 11 SP3

Teradata Database client applications run on many operating systems. For more information, see *Teradata Tools and Utilities 16.10 Supported Platforms and Product Versions* at:

<http://www.info.teradata.com>

Note: The following operating systems are not supported for running Teradata Database 16.10:

- MP-RAS
- Windows
- SLES 9

- SLES 10

Additional Information

URL	Description
http://www.info.teradata.com/	Use the Teradata Information Products site to: <ul style="list-style-type: none"> View or download individual manuals: <ol style="list-style-type: none"> Under Downloadable Publications, select General Search. Enter your search criteria and click Search. Download the user documentation package: <ol style="list-style-type: none"> Under Downloadable Publications, select General Search. In the Publication Product ID field, enter B035-1909, and click Search.
http://www.teradata.com	The Teradata home page provides links to numerous sources of information about Teradata. Links include: <ul style="list-style-type: none"> Executive reports, case studies of customer experiences with Teradata, and thought leadership Technical information, solutions, and expert advice Press releases, mentions and media resources
http://www.teradata.com/t/TEN/	Teradata Customer Education designs, develops and delivers education that builds skills and capabilities for our customers, enabling them to maximize their Teradata investment.
https://access.teradata.com	Use Teradata @ Your Service to access Orange Books, technical alerts, and knowledge repositories, view and join forums, and download software patches.
Teradata Community - Developer Zone	Provides new ideas and developer information.
Teradata Downloads	Provides publicly-available downloads from Teradata.

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Teradata Support

Teradata customer support is located at <https://access.teradata.com>.

Understanding This Release

Before you install or upgrade to this release of Teradata Database, you should read the following publications:

- Release Definition* provides information about basic system requirements.

This revision of *Release Definition* is applicable to Teradata Database 16.10. It contains references to features, functions, and requirements that may not apply to releases prior to TD 16.10, and changes to existing features, that may affect the way you use Teradata Database.

Note: If you are upgrading from an older Teradata Database release, you should read the *Release Definition* for every intervening release.

- *Release Summary* describes new features for this release. If you are upgrading from an older release of Teradata Database, you should also read the *Release Summary* for every intervening release to understand how the features in Release 16.10 differ from your current version.
- If you are new to Teradata Database, you should read *Introduction to Teradata* for an overview of Teradata Database features, functions, and capabilities before implementing this release.

Teradata Database Release Cadence

Please refer to the Teradata Support Policy document - <http://www.teradata.com/Teradata-Product-Support-Policies/>, section “Teradata Database Software Support Lifecycle” for details about the release cadence.

References to Teradata Platforms:

Teradata Platform Name	Abbreviated Teradata Platform Name
Teradata Data Mart Appliance 670/680	Teradata Data Mart 670/680
Teradata Integrated Big Data Platform 1700T/1700E/1800T/1800E	Same as full name
Teradata Data Warehouse Appliance 2690/2700/2750/2800/2850	Teradata DW Appliance 2690/2700/2750/2800/2850
Teradata Active Enterprise Data Warehouse 5650	Teradata Active EDW 5650
Teradata Active Enterprise Data Warehouse 6650/6650-SSD/6680/6690/6700/6750/6800	Teradata Active EDW 6650/6650-SSD/6680/6690/6700/6750
Teradata IntelliFlex™, Teradata IntelliBase™	IntelliFlex, IntelliBase

Items Available with this Release

Software CD-ROMs/DVDs/Downloads

Teradata Database Software CD-ROM/DVD

You will receive a Teradata Database software CD-ROM/DVD that includes one of the following Teradata Database software variations based on your order:

- Teradata Database for SUSE Linux Enterprise Server 11 SP1
- Teradata Database for SUSE Linux Enterprise Server 11 SP3

Other Software CD-ROMs/DVDs

Based on your system requirements, other software CD-ROMs/DVDs may accompany your order, including:

- Two operating system software DVDs that contain the Teradata Database for SLES operating system, service packs, and third-party software (not supplied for non-Teradata SMPs).
- Optional Teradata Tools and Utilities software: One or more CD-ROMs depending on software purchased.
- Teradata 16xx, 26xx, 27xx, 56xx, 66xx, 67xx, 68xx, Teradata IntelliFlex™, and Teradata IntelliBase™ platforms use SMWeb and a Service Workstation (SWS).

Software for SWS is available from Teradata @ Your Service at:

<https://access.teradata.com>.

Note: SWS/SMWeb is required for all MPP systems.

NodeType	Supported OS	Required Software	Supported Platforms
SWS Managed	<ul style="list-style-type: none"> • SLES 11 SP1 64-bit • SLES 11 SP3 64-bit 	Software available from: https://access.teradata.com .	<ul style="list-style-type: none"> • Teradata Active EDW 5650 and higher
SWS Unmanaged	<ul style="list-style-type: none"> • Windows Server 32-bit SP2 (for migrations from AWS on Windows 32-bit only) 	Software available from: https://access.teradata.com .	<ul style="list-style-type: none"> • Teradata Extreme Data Appliance 1xxx • Teradata DW Appliance 26xx and higher • Teradata Active EDW 5650 and higher

Additional Source of Software

You can find additional software and software updates (e-fixes) on Teradata @Your Service: <https://access.teradata.com>.

Teradata Client Software

Customers with active Service Agreements can find information on Teradata Database and Teradata Tools and Utilities release and client product compatibility in Product Roadmaps on Teradata @ Your Service (<https://access.teradata.com>).

Customers without support agreements should contact their sales or support team.

Note: For detailed BAR compatibility information, see the BAR application software compatibility matrix located at <https://access.teradata.com>.

For detailed information on the full range of tools and utilities, and the individual Teradata client product versions compatible with Teradata Database 16.10, see *Teradata Tools and Utilities Supported Platforms and Product Versions* at: <http://www.info.teradata.com>.

Library of User Defined Functions (UDFs)

A library of UDFs is available at [Teradata Downloads](#).

The terms under which these UDFs are available (“as is” with no support) are described on the website.

Software and Hardware Requirements

Supported Operating Systems and Platforms

The platforms listed in the following Knowledge Article are certified with Teradata Database Release 16.10, regardless of future platform discontinuation notices. For information on platform discontinuation, see the Knowledge Base Tech Note entitled “Teradata Hardware Discontinuation Roadmap” (available to Teradata personnel only).

See Knowledge Article KAP1B3136, “Teradata Platform and Minimum Database Version Compatibility Matrix”, for the minimum database/PDE version supported on a particular platform for specific operating systems. The Knowledge Article is accessed through <https://access.teradata.com>.

Operating System Requirements

SLES 10

Discontinued in Release 16.00.

SLES 11

Teradata Database 16.10 runs on SLES 11 SP1 and SLES 11 SP3.

Mixed Operating Systems

A mixed operating system includes both Trusted Parallel Application (TPA) nodes and non-TPA nodes.

Following are the basic system requirements for mixed operating systems:

- All TPA nodes must run the same operating system, but you can mix non-TPA nodes in any combination of the allowable operating systems.
- TPA nodes need not run on the same operating system as non-TPA nodes.
- Mixed OS allows two consecutive generations of nodes/storage across TPA and/or non-TPA nodes.
- The same version of BYNET must be deployed across the system.

Allowable platform combinations are the same as allowed for coexistence and coresidence systems.

For details on the platform, database, and operating system compatibility matrix see Knowledge Article KAP1B3136, accessed through <https://access.teradata.com>.

Teradata Tools and Utilities (TTU) 16.10

TTU 16.10 is the new version of Teradata Tools and Utilities released with Teradata Database 16.10.

TTU 16.10 supports Teradata Database 16.10 and two major-minor database releases forward and four major-minor releases backwards.

Current documentation about TTU and Database compatibility can be found in *Teradata Tools and Utilities Supported Platforms and Product Versions* at <http://www.info.teradata.com>.

Hardware Enhancement Options

You can upgrade Teradata system nodes, or add new nodes to a system, to enhance system capacity or performance. Teradata offers the following system enhancements, which are subject to some limitations by platform type:

- **Coexistence** allows you to combine existing system nodes with certain newer, more powerful node models, while assigning an unbalanced number of AMPs per node to optimize the usage of both current and new platform resources.
- **Coresidence** allows you to combine existing system nodes with certain newer, more powerful node models, while assigning a fixed number of AMPs per node, which may limit the usage of newer platform resources.
- **Upgrade** allows you to replace processors in an existing node to make it functionally equivalent to a more powerful node model.

Platform Coexistence and Coresidence Requirements

Determining whether a Teradata node can coexist or coreside with other node models depends on the platform type, performance class, the operating system, and the installed BYNET version of each node.

Coexistence and coresidence requirements are not part of the standard user documentation set, and are only available to Teradata personnel. For more information, contact Teradata Support Center.

Node Memory Recommendations

For best performance, Teradata recommends that each node has at least the minimum recommended RAM shown in Knowledge Article KAP1B3136 and at least 2.0 GB per Vproc (AMP, PE, TVS, GTW), but 4.0 GB is recommended per Vproc. Knowledge Article KAP1B3136 is accessed through <https://access.teradata.com>.

When upgrading to Release 16.10, several factors (including 1 MB Perm Row, In-memory Enhancements, AVRO DATSET, Multiple Count Distinct, and Queryable Column Information on Views) can cause some systems, especially large ones, to require additional memory.

The general guidelines for memory follow; however, memory requirements are workload dependent, so your system’s actual memory requirements may differ.

General Guidelines:

- Memory requirements are unchanged from Teradata Database 15.10
 - 2.0 GB memory per Vproc (AMP, PE, TVS, GTW) is required
 - Teradata In-Memory optimizations require 512 GB memory per node
- It is recommended to have a minimum of 4.0 GB memory per Vproc to get the most value and performance out of the Teradata Database 16.10
- Additional memory consumed will be based on size of system, AMPs per node, AWT and feature usage

See Knowledge Article KAP1B3136 (accessed through <https://access.teradata.com>) for node memory recommendations, including the default installed RAM per node, recommended minimum RAM per node, and recommended maximum RAM per node.

Note: The maximum amount of memory allowed per node may be increased between database releases. Always double check what the maximum memory amount is for your platform.

Release 16.10 can run on a system with the recommended minimum RAM, but performance may not be optimal, depending on the system configuration and the Teradata Database features you use. You should also factor in the following to determine the optimal memory configuration:

- Workload
- Memory-consuming features
- Performance requirements
- Cost of memory

Memory-Consuming Features

These features may require more memory for optimum system performance:

Release First Available	Memory Consuming Features
Pre-14.0	<ul style="list-style-type: none"> • PPI and multi-value compression • Join index, hash-join, stored procedures, and 128K data blocks • Cylinder read • LOBs and UDFs • 1 MB response buffer • Larger than 1 MB plan cache • External stored procedures • Table functions • Array INSERT • Java stored procedures • Online archive memory enhancements • More than 80 AWTs per AMP • Expanded table header • Geospatial data type

Release First Available	Memory Consuming Features
	<ul style="list-style-type: none"> • Increased join/subquery limits • Teradata Virtual Storage • Tunable UDF memory limit • Algorithmic compression and block level compression • XML DBQL logging • Global and Persistent Data (GLOP) • Large cylinder with cylinder read • More than 20 AMPs/Vprocs per node (all releases) • Temporal DBS support
14.0	<ul style="list-style-type: none"> • Teradata Columnar • Partial Online Reconfiguration • SLES 11 (first available in Release 14.0.2)
14.10	<ul style="list-style-type: none"> • Auto Stats Enhancements • Data Stream Architecture • Extended object naming • Geospatial indexing • Incremental planning and execution • Teradata Intelligent Memory • Teradata XML • 1 MB data block • 1 MB spool row • 128K parser tree segments
15.0	<ul style="list-style-type: none"> • JSON data type • 3D Geospatial • Scripting and Language support • DBQL – Show Parameters • 1 MB Phase 2 • Script Table Operators • QueryGrid: Teradata Database-to-Hadoop
15.10	<ul style="list-style-type: none"> • XSLT_SHRED_BATCH • In-memory optimizations • BSON and UBSON • Columnar Primary AMP/Primary Index • SQL Interface for Ferret SHOWBLOCKS • Parameterized Query Logging
16.00	<ul style="list-style-type: none"> • 1 MB Perm and Response Rows • In-memory Enhancements • AVRO DATASET • Multiple Count Distinct Performance • Queryable Column Information on Views
16.10	<ul style="list-style-type: none"> • None

For further information on memory requirements refer to the “Performance Management” appendix in the *Database Administration* book at <http://www.info.teradata.com/>.

Free Disk Space Requirements

For information on the amount of free disk space required on each Teradata Database node to upgrade to this release, see Knowledge Article IDA00108C82 accessed through <https://access.teradata.com>.

Additional Disk Space for Trace Files

The Write Ahead Logging (WAL) feature requires 5 MB per AMP of disk space for File System trace files. For example, if there are 10 AMPs per node, then trace files would require 50 MB per node of additional disk space, located in /var/opt/teradata/tdtemp.

Supported External Disk Arrays

For information about supported disk arrays, see the Product and Site Preparation Guide for your platform. The guides can be accessed through <https://access.teradata.com>.

Requirements for Third-Party Backup and Restore (BAR) Software

Supported Hardware

- 9200 Oracle/Sun/Storagetek SL500 *
- 9208 Oracle/Sun/Storagetek SL3000 *
- 9209 Oracle/Sun/Storagetek Oracle Key Manager for Tape Encryption *
- TMS, BAR Server, Model 457 Dell R710 *
- Teradata Managed Server (TMS) for BAR Model 655 and 855, Dell R720 *
- Teradata Multipurpose Server for BAR Model 8-51A/8-51D, Dell R730
- Teradata Managed Storage Server (TMSS), Dell R720XD *
- Teradata Multipurpose Storage Server for Appliance Backup Utility (ABU) and Data Stream Utility (DSU), Dell R730XD
- EMC Data Domain DD890 *
- Dell/EMC Data Domain DD4200
- Dell/EMC Data Domain DD7200
- Quantum i80, i500, and i6000 Tape Libraries
- Quantum Scalar Key Manager Server

* This hardware is no longer sold, but is still supported for Teradata Database Release 16.10.

Supported BAR Software

For information on backup and restore software product versions (IBM Tivoli, Symantec NetBackup, and Dell NetVault), see the BAR release matrix accessed through <https://access.teradata.com>.

For more information on backup and restore software products, see the following documents on <http://www.info.teradata.com>:

For more information on...	See the following documents...
Supported software	<i>Teradata BAR Backup Application Software Release Definition, B035-3114</i>

For more information on...	See the following documents...
Symantec NetBackup	<i>Teradata Extension for NetBackup Administrator Guide</i> , B035-2400
IBM Tivoli	<i>Teradata Extension for Tivoli Storage Manager Administrator Guide</i> , B035-2444
Teradata Archive/Recovery Utility (ARC)	<ul style="list-style-type: none"><li data-bbox="526 310 1187 338">• <i>Teradata Archive/Recovery Utility Reference</i>, B035-2412<li data-bbox="526 344 1455 401">• For information on ARC versions compatible with this release, see <i>Teradata Tools and Utilities Release Definition</i>, B035-2029 <p data-bbox="573 407 1422 434">Note: This utility is not compatible with Teradata Database MAPS architecture.</p>

Data Stream Architecture (DSA) Characteristics Compared to Teradata Archive/Recovery Utility

In addition to Teradata Archive/Recovery Utility (ARC) and third-party BAR solutions, Teradata offers Data Stream Architecture to meet customer BAR needs. DSA support differs from ARC. For example:

- DSA restore processes index builds in parallel for a table. This shortens the time to complete the restore but uses more resources. For this reason, DSA allows the customer to use Teradata dynamic workload management software to control the number of parallel DSA jobs that can be run at one time.
- Unlike legacy BAR, DSA establishes a consistency point for offline archive. DSA locks all tables at the beginning of the archive. There is a 100,000 database lock limit on the system.
- Actions automatically performed by DSA that required special action in legacy BAR applications:
 - Compile UDFs and stored procedures
 - Alter PPI tables
 - Revalidate indexes
 - Run post_dbc_restore
- DSA has no restart capability.
- DSA removes HUT locks after ABORT but ARC does not.
- DSA does not archive or restore PJ tables.
- DSA does not do PPI partition-level archive or restore.
- DSA does not do cluster dump and restore.

Note: The Teradata Archive/Recovery Utility is not supported if MAPS is enabled.

Compilers

Installation of a C++ compiler is required on at least one database node configured with a PE VPROC. C++ compilers are included with each Teradata Database release as part of the operating system software disks.

Software and Hardware Restrictions

TDGSS Single Mechanism to Log-On (TDNEGO) Unity Support

Unity for Teradata Database 15.10 and later does not support TDNEGO. Teradata recommends disabling TDNEGO on Unity servers when the Unity version for Release 15.10 or later is installed. For more information, see *Security Administration*.

1 MB Perm and Response Rows

This feature is not supported on Small Cylinder systems (such as systems using a maximum cylinder size of 3872 sectors or approximately 1.9MB).

Teradata Archive/Recovery Utility

This utility is not compatible with Teradata Database MAPS architecture. If MAPS is enabled, use DSA for archive/recovery operations. For more information about DSA, see *Teradata Data Stream Architecture (DSA) User Guide*, B035-3150.

Deprecated Kanji1 Character Set

As of Release 14.0 and later, Kanji1 support is deprecated and planned for discontinuation. Although many Kanji1 queries and applications may continue to operate, you should prepare to convert Kanji1 data to another character set as soon as possible.

During an upgrade to Teradata Database from a pre-14.0 release, the system automatically replaces DEFAULT CHARACTER SET KANJI1 with DEFAULT CHARACTER SET UNICODE in existing user definitions.

Kanji1 Restrictions

As part of the plans for discontinuing Kanji1 support, creation of new Kanji1 objects is highly restricted. For example, inclusion of the phrase CHARACTER SET KANJI1 in the following statements returns a syntax error:

- CREATE USER/MODIFY USER
- CREATE TABLE/ALTER TABLE
- CREATE FUNCTION/REPLACE FUNCTION
- CREATE TYPE/ALTER TYPE
- CREATE PROCEDURE/REPLACE PROCEDURE
- CREATE MACRO/REPLACE MACRO
- CREATE VIEW/REPLACE VIEW
- CAST function

Use the TRANSLATE function to convert existing Kanji1 data to Unicode or another supported server character set. For more information, see “TRANSLATE” in *SQL Functions, Operators, Expressions, and Predicates*.

Compatibility Views

Compatibility views convert the native variable length Unicode object names into 30 bytes of either Latin or Kanji1. This can cause loss of information by truncation or inability to convert object names longer than 30 characters into Latin or Kanji1. Characters that cannot be converted are replaced by the substitution character, which is 0x1A for both Latin and Kanji1.

As with all character data, when object names are returned to the user they are converted to the session character set. This conversion can produce loss of information if the characters in the object name cannot be converted to the session character set or exceed the export width for the character data.

Teradata recommends using Unicode views. For more information, see *Data Dictionary*.

Security-Related Restrictions

Custom Authentication Mechanisms

Development and deployment of a custom authentication mechanism for use with this release can only be achieved by purchasing the Teradata Security Software Developer Kit.

Note that development and deployment of a custom authentication mechanism results in the creation of a custom encryption software product. Distribution of a custom encryption product outside the U.S. and Canada is regulated by the U.S. Department of Commerce (DOC). An export authorization must be filed for and obtained from DOC in order to export such custom products. For information on obtaining an export authorization, please see the DOC website at [BIS Website](#).

If additional information is required, customers should contact their Teradata representative. Teradata representatives requiring help should contact Teradata Corporate Export Compliance in the Law Department of WHQ.

Note: A custom authentication mechanism is a user authentication mechanism that is above and beyond the mechanisms that are provided with Teradata Database:

1. Teradata Method 2
2. KRB5 (Kerberos authentication)
3. LDAP
4. SPNEGO (used for Kerberos authentication for logons from Windows .NET clients)
5. TDNEGO

System-Level Software Restrictions

- JRE 1.8 must be installed on the database server prior to installing Teradata Database 16.10.

- Only one instance of the Teradata Database is supported on a system.
- Teradata Tools and Utilities, including utilities running on mainframes, must be installed at or upgraded to Teradata Tools and Utilities 16.10 to take advantage of all Teradata Database 16.10 features and functions.
- For coexistence and coresidence systems, all nodes within a single MPP system must run the same version of the operating system and the Teradata Database software.
- For additional restrictions, dependencies, and performance considerations when running the Teradata Database applications, see [Running Teradata Database with Other Applications](#).
- Backup and restore management utilities are not provided as part of Teradata Database but are available as separate products. For more information, see [Supported BAR Software](#).
- A maximum of 1200 concurrent LAN-connected sessions are allowed per node.
- The maximum number of sessions for mainframe clients is 120 x the number of configured Parsing Engines (PEs) for each TDP (Logical Host ID).

Obsolete and Unsupported Tools, Utilities, Options, Record Types, and Other Software

Utility	Description
dbcontrol	<ul style="list-style-type: none"> • Priority scheduler functions must be controlled through Viewpoint. • The ObjectUseCountCollectRate option is obsolete. Use the DBQL USECOUNT option. • Other obsolete DBS Control fields in Release 16:00: <ul style="list-style-type: none"> ○ DisplacementOnOverlap ○ MDS Is Enabled (see Meta Data Services below)
dbscsp	The dbscsp tool, used only on MP-RAS systems, is no longer supported. The executable /usr/ntos/bin/dbgcsp now links to fdscsp instead of dbscsp.
Filer	CSA WAL log record type is not supported. /V option of the FIB command is not supported.
Teradata Multitool	Discontinued in Release 14.0 – use Teradata Database command line utilities.
PMON	Discontinued in Release 14.0 – use Teradata Viewpoint.
Teradata Dynamic Workload Manager	Discontinued in Release 14.0 – the last release that contained this product was Release 13.0. Use Teradata Viewpoint.
Teradata Manager	Discontinued in Release 14.0 – the last release that contained this product was Release 13.0. Use Teradata Viewpoint.
Teradata Query Director	Discontinued in Release 14.0 – the last release that contained this product was Release 13.10. Use Teradata Unity.
gdviewer	Utility is no longer supported.
gtwcontrol	Removed -b option. Deprecated logons are no longer allowed.
rcvmanager	F7 help is not available.
rssmon	The rssmon utility (Resource Sampling System Monitor) was only usable on MP-RAS systems, and is obsolete now that Teradata Database is no longer supported on MP-RAS.
tdgsspkgrm	Discontinued in Release 15.10.01.
tdssearch	Due to limited functionality tdssearch has been replaced by ldapsearch, which is included with Teradata Database 13.10 and up.
xschmon	No longer supported.
vpacd	Mostly for older hardware; rarely used. May be ported to open-PDE (Linux).

Release Definition, Release 16.10

Utility	Description
Replication Services	<p>TRS (Teradata to Teradata replication) was discontinued for new sales as of August 2011. Aligned with that discontinuation, no further enhancements have been made since the TRS 13.10 release. TRS 13.10 has been certified with Teradata DB 14.00 and 14.10 versions but with no new feature support and for existing customers only. The Unity product portfolio is positioned as the replacement for TRS, either through a Unity / Loader implementation or possibly Data Mover dependent on latency tolerance.</p> <p>Note: Replication from third-party solutions to Teradata is still supported by Oracle GoldenGate.</p>
Teradata Statistics Wizard (TSWIZ)	Discontinued in Release 15.0 – the last release that contained this product was TTU 14.10. Replaced by Teradata Viewpoint Stats Manager.
OLE DB Provider for Teradata	Discontinued in Release 15.10 – the last release that contained this product was TTU 15.0. Use Microsoft’s OLE DB Provider for ODBC and Teradata ODBC Driver products together as the replacement.
Transparency Series/Application Programming Interface (TS/API) (mainframe)	Discontinued in Release 15.10 – the last release that contained this product was TTU 15.0. Capped at supporting Query Management Facility (QMF) 9.1. Use an SQL query tool, such as Teradata Studio, as a replacement.
Teradata Monitor	Discontinued in Release 15.10 – the last release that contained this product was TTU 15.0. Replaced with a set of Teradata table functions embedded in the Teradata Database.
Teradata Data Mart Edition	Discontinued in Release 15.10 – the last release that supported this product was Teradata Database 15.0. Teradata Database is no longer natively supported on 3 rd party SMP computers running specific versions of SUSE Linux. The replacement product is Teradata Virtual Machine Edition (TVME). Please refer to the separately published <i>Order and Configuration Information</i> document for TVME.
DBS Check tool (dbschk)	Discontinued in Release 15.10 – the last release that contained this product was Release 15.0. Replaced by the Mailbox Check (mboxchk) tool. See the man page for information.
Meta Data Services (MDS)	Discontinued in Release 15.10 – the last release that contained this product was Release 15.0.
ITEQ, HUT CNS	Discontinued in Release 15.10 – the last release that contained this product was Release 15.10.
Teradata Query Scheduler (TQS)	Discontinued in Release 16.00 – the last release that contained this product was Release 16.20.
Teradata Administrator	Discontinued in Release 15.10 – the last release that contained this product is TTU 15.10. Note: Teradata Administrator was not enhanced for Release 15.10, so there is no new feature support in this product for Release 15.10. Replaced by Teradata Studio.
SQL Assistant	Discontinued in Release 16.00 – the last release that contains this product is Release 16.20. Replaced by Teradata Studio and Teradata Studio Express.
DULTAPE	Discontinued in Release 16.10 – the last release that contains this product is Release 16.00. Can continue to use DUL.
Teradata Visual Explain (VEComp)	Discontinued in Release 16.00 – Release 16.20 is the last release to contain this product.
SLES 10	Discontinued in Release 16.00– the last release that contained this product was Release 15.10.
Teradata Method 1 (TD1), NTLM, NTLMC, and KRB5C	Discontinued in Release 16.10 – Release 16.00 is the last release to offer these authentication mechanisms. They must be manually enabled to use them in Release 16.00.
tdgssversion	Discontinued in Release 16.10 – the last release that contained this product was Release 16.00.

Changes in System Behavior

Default Feature Status

In previous releases, some features were activated by default and others were manually activated, depending on whether the Teradata Database system had a fresh installation (sysinit) or an upgrade.

Release 16.00 and later features do not require a sysinit to be enabled. Features in earlier releases that required a sysinit still require a sysinit (see TD 15.10 *Release Definition* for details).

Feature	License Tiers	Upgrade Sysinit	Effects and Comments
In-Memory Optimization	Developer: Not Applicable Base: Not Applicable Advanced: Not offered Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	To enable, contact Teradata Support Center.
Columnar Primary AMP Index or Primary Index	Developer: Included Base: Included Advanced: Included Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	Columnar must be enabled and NoDot0backdown=true to get full functionality. To enable, contact Teradata Support Center.
Temporal	Developer: Included Base: Included Advanced: Included Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	To enable, contact Teradata Support Center. Note: After Temporal is enabled, it cannot be disabled.
Teradata Secure Zones	Developer: Included Base: Included Advanced: Included Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	Teradata Secure Zones must be enabled and NoDot0backdown=true to get full functionality. To enable, contact Teradata Support Center.
Teradata Database MAPS architecture (MAPS)	Developer: Included Base: Included Advanced: Included Enterprise: Included	Upgrade: Disabled Sysinit: Enabled	In Release 16.10 this feature is: <ul style="list-style-type: none"> • Enabled for new installations. • Disabled by default on upgraded systems. To enable, contact Teradata Support Center. After this feature is enabled Backdown is not supported. Note: The Teradata Archive/Recovery Utility is not supported if MAPS is enabled.
Adaptive Optimization	Developer: Includes IPE Base: Includes IPE Advanced: Includes IPE Enterprise: Includes Enhanced IPE	Upgrade: Enabled for Enterprise Sysinit: Enabled for Enterprise	Enhanced IPE provides: <ul style="list-style-type: none"> • Noncorrelated subqueries with small results set • Single-row query blocks • Derived table or view produces zero rows or a single row • Spooled subqueries with smaller result sets • Advanced rewrites based on results feedback

Feature	License Tiers	Upgrade Sysinit	Effects and Comments
Block loads between Row Level Security (RLS) tables and non-RLS tables	Developer: Included Base: Included Advanced: Included Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	To enable, contact Teradata Support Center.
IN-list Rewrite	Developer: Included Base: Included Advanced: Included Enterprise: Included	Upgrade: Enabled Sysinit: Enabled	To disable this feature, use DBS Control fields. For more information, see <i>Utilities</i> , B035-1102.
TASM I/O Usage Event	Developer: Not Applicable Base: Not Applicable Advanced: Not Applicable Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	To enable, contact Teradata Support Center. For more information, see <i>Workload Management User Guide</i> , B035-1197, or <i>Teradata Viewpoint User Guide</i> , B035-2206.
Workload Management	Developer: Not Applicable Base: Not Applicable Advanced: TIWM Enterprise: TASM	Upgrade: Disabled Sysinit: Disabled	To enable, contact Teradata Support Center. The appropriate license must be purchased first.
Intelligent Memory (TIM)	Developer: Not Applicable Base: Not Applicable Advanced: Included Enterprise: Included	Upgrade: Disabled Sysinit: Disabled	TIM is enabled when the appropriate license and memory are purchased. To enable, contact Teradata Support Center.
TVS (Hybrid Storage)	Developer: Not Applicable Base: Not Applicable Advanced: Not Offered Enterprise: Included	Upgrade: Enabled Sysinit: Enabled	TVS (Hybrid Storage) is enabled by default when using the hybrid storage system.
Concurrent Query Limit	Developer: 2 Base: 15 Advanced: None Enterprise: None	Upgrade: Enabled Sysinit: Enabled	Appropriate license must be purchased first.

Default activation may cause changes in system behavior compared to previous releases. Even after activation, some features may require additional configuration.

Features in prior releases that required the DBS Control NoDot0Backdown flag no longer check the flag because you cannot back down from Release 16.10. If enabling a feature required a special method, then that method must still be followed for that feature.

1 MB Response Rows

In prior releases, client-server response messages were limited to 1 MB. In Release 16.00 and later, Teradata Database supports client-server response messages of up to 16 MB. Applications designed for Teradata Database Release 16.00 and later can take advantage of this larger message size.

1 MB Maximum Request Bytes

In prior releases, client-server requests were limited to 1 MB. In Release 16.00 and later, Teradata Database supports client-server SQL requests of up to 7 MB.

DBS Control Changes

The default value of the MaxParseTreeSegs field is increased to 3,000 in Release 16.0 and later. The value is automatically increased on upgrade if the current value is less than the new default.

The following DBS Control fields are obsolete in Release 16.00 and later:

- DisplacementOnOverlap
- MDS Is Enabled

In previous releases the ROUND and TRUNC functions returned a DATE type if they were passed a TIMESTAMP type. In release 16.10, a new DBS Control General field, TruncRoundReturnTimestamp, can be set to TRUE to have these functions return TIMESTAMP values in this situation.

Execute SCRIPT Table Operator with a Specific Authorization/OS User

You can grant the EXECUTE privilege on an authorization object. Granting EXECUTE on an authorization object allows the grantee to execute the SCRIPT table operator using the credentials provided by the authorization object. This mechanism essentially binds the execution of a script by a database user to a valid operating system user. You can create your own authorization objects or use the default authorization, SYSUIF.DEFAULT_AUTH. If a database user has the EXECUTE privilege WITH GRANT OPTION on an authorization object, they can grant EXECUTE on that authorization object to another user.

Fallback and Clustering

When a table has FALLBACK protection, Teradata Database stores two copies of every row in the table, a primary copy and a fallback copy. The fallback copy is stored on a different AMP than the primary copy. This protects against failure of the AMP storing the primary copy. AMPs are assigned to clusters, in which the AMPs provide fallback protection for each other. A cluster must consist of at least two AMPs and is limited to at most eight AMPs.

Legacy versus Dedicated Fallback

The Teradata MAPS feature introduces a new *dedicated fallback* scheme. In this scheme, one AMP in the cluster stores all fallback rows for one other AMP in the cluster. For example, consider a four-AMP

cluster (AMPs 0, 1, 2, and 3). If AMP 0 has nine rows, AMP 1 has all nine fallback rows for AMP 0; AMPs 2 and 3 do not have any fallback rows for AMP 0. Similarly, AMP 2 provides fallback protection for AMP 1, AMP 3 for AMP 2, and AMP 0 for AMP 3.

In prior versions of Teradata Database, *legacy fallback* was used. In this scheme, each AMP in a cluster contains fallback copies of primary data from all the other AMPs in the cluster. For example, consider a four-AMP cluster (AMPs 0, 1, 2, and 3). If AMP 0 contains nine rows of primary data, the fallback copies of those rows are spread among AMPs 1, 2, and 3.

New maps created on systems upgraded to Teradata Database 16.10 from prior versions use dedicated fallback; however, tables that still use existing maps from releases prior to 16.10 use legacy fallback. For systems that use two-AMP clusters, dedicated and legacy fallback operate identically.

Heatmap Table Function Integration and Enhancements

If you installed the `td1410_heatmap` function, this older version will be deleted from the system when you upgrade to Teradata Database 16.00. If you have scripts that reference `td1410_heatmap`, you must rewrite them to use the new function name, `tdheatmap`.

Note: Users cannot install the heatmap function from Developer Zone after upgrading to Release 16.00 and later.

Java Runtime Environment (JRE 1.8)

Java 8.0 is required before installing Teradata Database 15.10.01 or later. Users can now run Java UDFs and external stored procedures compiled with JDK 8.0 on Teradata JRE 1.8

Link-local IP Address Restrictions

In Teradata Database 16.00 or later, IPv4 and IPv6 link-local IP addresses (169.254.0.0/16 for IPv4 and fe80::/10 for IPv6) are blocked from connecting to the database. Once the link-local restrictions are configured (by upgrading or installing Release 16.00 and later), backing down will not remove the restrictions. If link-local IP addresses are needed, they must be manually allowed.

If the upgrade or installation detects the Teradata Database system is currently using `ipfilters`, the link-local restriction will not be imposed and a warning message will advise adding the link-local restriction manually.

For instructions on modifying the link-local IP address configuration, see *Security Administration*.

Packageless TeraGSS

TeraGSS is now embedded in client drivers eliminating TeraGSS installation and configuration. If there is a need to configure TeraGSS on a client, see the appendix regarding Teradata GSS Administrative Package in *Security Administration* (note, Teradata recommends not configuring TeraGSS).

The tdgssversion tool has been removed.

Unity uses TDGSS instead of TeraGSS. For information about Unity, see *Teradata Unity Installation, Configuration, and Upgrade Guide for Customers* (B035-2523) and *Teradata Unity User Guide* (B035-2520).

Resource Usage Macros

Some ResUsage macros use Node ID as an input parameter to select the data for the desired node or nodes, and display the Node ID in the macro execution. For these macros, the Node ID parameter type is extended from CHAR(6) to CHAR(9) (from 'CCC-MM' to 'CCCC-MMMM') to accommodate the new node id format of 4-digit cabinet number and 4-digit module number. The affected macros are:

- ResCPUByAMP
- ResCPUByAMPOneNode
- ResCPUByNode
- ResCPUByPE
- ResCPUByPEOneNode
- ResCPUOneNode
- ResHostByLink
- ResHostOneNode
- ResLdvByNodem
- ResLdvOneNode
- ResMemMgmtByNode
- ResMemMgmtOneNode
- ResNetByNode
- ResNetOneNode
- ResOneNode
- ResPdiskByNode
- ResPdiskOneNode
- ResVdiskByNode
- ResVdiskOneNode
- ResPsByGroup
- ResPsByNode
- ResAWTByNode

SHOW QUERY LOGGING FeatureUsage Field

The SHOW QUERY LOGGING statement output now includes the FeatureUsage field to indicate whether Feature Use logging is in effect. Feature Use logging is specified using the WITH

FEATUREINFO option of the BEGIN QUERY LOGGING and REPLACE QUERY LOGGING statements. For more information, see BEGIN QUERY LOGGING, REPLACE QUERY LOGGING, and SHOW QUERY LOGGING in *SQL Data Definition Language – Syntax and Examples*.

Teradata Database MAPS architecture

The Teradata Database MAPS architecture changes what customers see in Teradata Database when compared with previous releases, whether or not the feature is enabled.

MAPS impacts the following:

- There are new dictionary tables and changes to existing dictionary tables to support maps.
- User tables are defined to use TD_Map1, which includes all the AMPs in the system. Initially, it is the system-default map.
- Data Dictionary tables are defined to use TD_DataDictionaryMap, except for nonhashed tables in database DBC, which are defined to use TD_GlobalMap.
- The Teradata Archive/Recovery Utility (ARC) is not compatible with the Teradata MAPS feature. If MAPS is enabled, use Teradata Data Stream Architecture (DSA) for archive/recovery operations. For more information about DSA, see *Teradata Data Stream Architecture (DSA) User Guide*, B035-3150.

If MAPS is enabled, you cannot backdown.

For more information, see *Database Administration*.

TDGSS Single Mechanism to Log-On Client Support

TDNEGO now supports the following clients, in addition to the CLI and ODBC clients:

- JDBC
- Windows .NET

For more information, see *Security Administration*.

TDWM UDF GDO Size

The GDO for TDWM.TDWMActiveWDS exceeds the size of the protected buffer, so this function has been updated to use the non-protected buffer. Note, this means the function is not protected.

Trigger Enhancement for Row Level Security Tables

This enhancement allows triggers to reference RLS-protected tables. Triggers on non-protected tables can update a protected table and triggers on protected tables can update a non-protected table. Referenced tables in the triggers must have identical constraints.

Trusted Session Support in X Views

X Views are enhanced to return results based on the current authorized user. Previously, results were not returned for proxy users granted access through Queryband. Now X views return results for the proxy user, if the current authorized user is set to a Trusted Sessions proxy user. If the user is not a proxy user, the results returned are based on the current user and the current user's access rights. For more information, see *Data Dictionary*.

Unicode Pass Through

Customers can now store and retrieve unsupported Unicode characters, including Emoji and other ideographs. If enabled for a session, Unicode Pass Through (UPT) allows users to pass through Teradata unsupported Unicode characters and unassigned Unicode characters to the Teradata Database. Pass through characters include:

- BMP from Unicode versions 6.1.0 to 9.0.0, which Teradata does not support, including emoji
- SMP from all Unicode versions, which Teradata does not support
- Unassigned characters
- Private use characters

Note: Although the Pass Through Characters (PTCs) can be stored in the Teradata Database, they are not fully supported. For example, collation, case sensitivity, and object name support are not included with this feature.

Noncharacter exceptions and invalid character encoding form (ill-formed code unit sequence) exceptions will not occur for a Pass Through Session when importing from UTF8 or UTF16 sessions to the UNICODE server character set. They are changed to one or more replacement character(s), (U+FFFD), without consuming valid successor bytes as described in the Unicode Standard (see <http://www.unicode.org/versions/Unicode8.0.0>).

UPT is not supported with FastLoad, MultiLoad, Teradata Parallel Data Pump (TPump), FastExport, and OLE DB Provider for Teradata. Use Teradata Parallel Transporter (TPT), BTEQ, or the Teradata JDBC Diver to load and unload PTC data. If you do not specify Unicode Pass Through for a session, the default is OFF.

Because the internal representation of PTCs is UTF-16, a supplementary character is represented in the UNICODE server character set as two 16-bit UTF-16 code units, or 4 bytes. So VARCHAR(2), or CHAR(2), are the minimum sizes required in order to store a PTC.

Cleansing and Loading Data with Unicode Pass Through

You may have existing processes in place to cleanse Unicode data before loading it into Teradata Database, such as access modules and UDFs. To take full advantage of Unicode Pass Through, you must change or eliminate prior methods of cleansing Unicode data before loading. See the TPT documentation for details on configuring how TPT uses access modules. For details about configuring

access modules to allow pass through characters, see *Teradata Tools and Utilities Access Module Reference*, particularly the sections regarding automatic character conversions.

For more information about Unicode Pass Through, see:

- SET SESSION in *SQL Data Definition Language – Syntax and Examples*
- *Release Summary*
- *International Character Set Support*

Changes to the TeraGSS Configuration in TTU

Installation of Teradata Tools and Utilities (TTU) client software includes installation of the TeraGSS security module. For 14.00.xx and previous versions of TTU software, the install process sometimes failed during the creation of the `tdgssconfig.bin` file.

Beginning with TTU 14.10 the TTU install process only creates a `tdgssconfig.bin` file when required. Because of the install procedure, additional action may be required on some clients to avoid:

- Causing the system to ignore any custom configuration settings in the `TdgssUserConfigFile.xml`.
- Possible future upgrade failures related to the `tdgssconfig.bin` file.

The effects of the TTU 14.10.xx install process and further required action vary with the TTU/TeraGSS pre-upgrade and post-upgrade versions, and whether the `TdgssUserConfigFile.xml` has custom settings.

Note: Actions shown in the table below are required whenever you install one of the listed post-upgrade TTU versions on a client that is currently running a listed pre-upgrade version.

Pre-Upgrade TTU Version	Post-Upgrade TTU Version	Status of Tdgss UserConfigFile	Required Action
TTU 14.00.xx and earlier	TTU 14.10.00 through 14.10.02 (TeraGSS 14.10.00.00)	Without custom settings	No action required.
		With custom settings	No action required.
TTU 14.00.xx and earlier	TTU 14.10.03 and up (TeraGSS 14.10.00.01 and up)	Without custom settings	No action required.
		With custom settings	Execute the "run_tdgssconfig" script manually after the TTU upgrade, to automatically create <code>tdgssconfig.bin</code> files on future upgrades. If you do not run the script, custom settings in <code>TdgssUserConfigFile.xml</code> are no longer in effect.
TTU 14.10.00 through TTU 14.10.02 (TeraGSS 14.10.00.00)	TTU 14.10.03 and up (TeraGSS 14.10.00.01 through 15.10.00)	Without custom settings	After completing the upgrade to the new TTU version, remove the <code>tdgssconfig.bin</code> file, if present. For more information, see Deleting tdgssconfig.bin Files on Teradata Clients . Removing the file avoids creating a <code>tdgssconfig.bin</code> file (not needed if there are no custom settings) which could cause problems in future TTU upgrades.
		With custom settings	Execute the "run_tdgssconfig" script manually after the TTU upgrade, to automatically create <code>tdgssconfig.bin</code> files on future upgrades. If you do not run the script, custom settings in <code>TdgssUserConfigFile.xml</code> are no longer in effect.

TTU 14.00.00 through 15.10.03 (TeraGSS 14.00.00 through 15.10.00)	TTU 15.10.04 (TeraGSS 15.10.01)	Without custom settings	<ul style="list-style-type: none"> Remove the old version of TeraGSS. Install the new version of TeraGSS (version 15.10.01 or later) in a user selected directory.
		With custom settings	<ul style="list-style-type: none"> Save the custom configuration file (TdgssUserConfigFile.xml). Remove the old version of TeraGSS. Install the new version of TeraGSS (version 15.10.01 or later) in a user selected directory or in the default directory. Create the client/etc/site directory in the new installation by running client/<i>version</i>/bin/run_tdgssconfig. Copy the saved custom configuration file to the site directory. Execute run_tdgssconfig to initialize the custom configuration.
TTU 15.10.04 and up (TeraGSS 15.10.01)	TTU 16.00 (TeraGSS 16.00)	Without custom settings	<ul style="list-style-type: none"> No action required.
		With custom settings	Execute the "run_tdgssconfig" script manually after the TTU upgrade, to automatically create tdgssconfig.bin files on future upgrades. If you do not run the script, custom settings in TdgssUserConfigFile.xml are no longer in effect.
TTU all versions	TTU 16.10 and up	Without custom settings	<ul style="list-style-type: none"> No action required.
		With custom settings	<p>If configuration is required, an optional Teradata GSS Administrative Package may be installed on the client and configuration may be performed. Note, Teradata recommends not configuring or customizing the clients.</p> <ul style="list-style-type: none"> Save the custom configuration file (TdgssUserConfigFile.xml). Remove the old version of TeraGSS. Install the new version of Teradata GSS Administrative Package (version 16.10 or later) in a user selected directory or in the default directory. Create the client/etc/site directory in the new installation by running client/<i>version</i>/bin/run_tdgssconfig. Copy the saved custom configuration file to the site directory. Execute run_tdgssconfig to initialize the custom configuration. <p>For more information, see Teradata GSS Administrative Package in <i>Security Administration</i>.</p>

For more information on run_tdgssconfig, see “Changing the TDGSS Configuration” in *Security Administration*. For installation information, see the Teradata Tools and Utilities installation guide for your operating system at <http://www.info.teradata.com>.

Deleting tdgssconfig.bin Files on Teradata Clients

After completing the upgrade to the new TTU version, if required by the rules in [Changes to the TeraGSS Configuration in TTU](#), remove the tdgssconfig.bin file, if present in the following locations.

Note: The <version> to be removed is always 14.10.00.01 or higher.

Affected 64-bit Teradata clients contain both 32-bit and 64-bit tdgssconfig.bin files. You must remove both the 32-bit and 64-bit files.

Note: For upgrades to TeraGSS 15.10.01, the older version is removed entirely as part of the installation, which includes removing the `tdgssconfig.bin` file, so the following does not apply.

For upgrades to TeraGSS 15.10.00 and before, remove the `tdgssconfig.bin` file from the following locations depending on your operating system:

Client Operating System	File to Be Removed
Windows 32-bit (nt-i386)	<ul style="list-style-type: none"> • \Program Files\Teradata\Teradata GSS\Site\nt-i386<version>\tdgssconfig.bin
Windows 64-bit (nt-x8664)	<ul style="list-style-type: none"> • 32-bit file: \Program Files\Teradata\Teradata GSS\Site\nt-i386<version>\tdgssconfig.bin • 64-bit file: \Program Files\Teradata\Teradata GSS\Site\nt-x8664<version>\tdgssconfig.bin
UNIX 32-bit	<ul style="list-style-type: none"> • Linux: /opt/teradata/teragss/site/<operating_system-cpu_type>/<version>/tdgssconfig.bin • HP-UX and AIX: /usr/teragss/site/<operating_system-cpu_type>/<version>/tdgssconfig.bin • Solaris: Path is similar to either Linux or HP-UX/AIX, depending on file options used. <p>Where the <operating_system-cpu_type> can be: linux-i386, aix-power.32, hpux-ia64.32, hpux-pa.32, solaris-sparc.32, solaris-i386, or linux-390.32.</p>
UNIX 64-bit	<p>32-bit files:</p> <ul style="list-style-type: none"> • Linux: /opt/teradata/teragss/site/<operating_system-cpu_type>/<version>/tdgssconfig.bin • HP-UX and AIX: /usr/teragss/site/<operating_system-cpu_type>/<version>/tdgssconfig.bin • Path is similar to either Linux or HP-UX/AIX, depending on file options used. <p>Where <operating_system-cpu_type> can be: linux-i386, aix-power.32, hpux-ia64.32, hpux-pa.32, solaris-sparc.32, solaris-i386, or linux-390.32.</p> <p>64-bit files:</p> <ul style="list-style-type: none"> • Linux: /opt/teradata/teragss/site/<operating_system-cpu_type>/<version>/tdgssconfig.bin • HP-UX and AIX: /usr/teragss/site/<operating_system-cpu_type>/<version>/tdgssconfig.bin • Path is similar to either Linux or HP-UX/AIX, depending on file options used. <p>Where <operating_system-cpu_type> can be: linux-x8664, aix-power, hpux-ia, hpux-pa, solaris-sparc, solaris-x8664, or linux-390.</p>
Mac OS	/Library/Application Support/teradata/teragss/<version>/etc/tdgssconfig.bin

System Views

Some Teradata Database releases make changes to system views. See "Revision History" in *Data Dictionary* for a list of changes to system views for this release.

Compatibility Views are deprecated. For more information, see [Compatibility Views](#).

Recompiling Stored Procedures

When you upgrade to or across a major Teradata Database release, for example, when upgrading or migrating to Release 16.10 from any previous release, including 15.10, you must recompile stored procedures. If PUT is used, it automatically recompiles stored procedures if the source is available on the system. It also generates a report of stored procedures without source (such as stored procedures originally compiled with the NOSPL option) that must be recreated. For more information, see *Teradata Database Node Software Upgrade Guide: Major/Minor*, B035-5943.

Teradata Unity 16.00

Unity 16.00 supports Teradata Database 14.00 through Teradata Database 16.00.

Documentation Changes

This section lists additions and changes to the released user documentation, until the documentation is updated to include the changes. This section also includes changes that happened from the previous release to the current release.

- No new user documents were added with this release.

Installation, Upgrade, Migration, and Backdown (IUMB)

Teradata supports customer-performed maintenance and patch upgrades. Contact your sales or customer support representative (CSR) for questions.

For changes in behavior that impact upgrade or migration, see [Changes in System Behavior](#).

Supported IUMB Operations

Teradata Database 16.10 supports the following IUMB operations:

- Installation of Teradata Database 16.10 on all supported platforms and operating systems.
- Upgrade to Teradata Database 16.10 from the releases shown in Knowledge Article IDA00108C82, available from Teradata @ Your Service (<https://access.teradata.com>). If your current Teradata Database version is not listed as an approved upgrade starting version, you must first upgrade to an approved starting version before upgrading to this release. Contact the Teradata Support Center for details.

For information on upgrades from older releases, see [Upgrading from Older Releases](#).

- Migration from Teradata Database 14.00 and later. Migrations from previous releases require an intermediate migration.

IUMB Planning

- Upgrade scripts and the upgrade estimator tool are available in the PUTTools package. Always get the latest version. For all IUMB Change Controls obtain PUTTools from <https://access.teradata.com>.
- Teradata @ Your Service (<https://access.teradata.com>) provides access to copies of other items required for IUMB procedures such as:
 - The Certified List of software packages for each supported Teradata Database version, including recently updated versions of software packages.
 - Required application and operating system software patches, firmware, drivers, service packs and hotfixes.
- You must upgrade your Teradata Client software to at least the minimum supported release before or at the same time as you upgrade to this release.
- Some features are enabled by default during a sysinit when upgrading or migrating and may affect system behavior. To see if the current release is affected, see [Default Feature Status](#).

Upgrading Teradata Temporal Tables

Teradata originally introduced support for creating and manipulating temporal tables before an ANSI/ISO standard had been developed. Consequently, the original Teradata Temporal Tables and SQL syntax do not conform to the ANSI standard. If you upgrade from a Teradata Database release prior to 15.0, and you were using Teradata Temporal Tables, you can choose to either continue using them or convert to using ANSI standard temporal tables and syntax.

For more information on the differences and ramifications, see the *Utilities* manual, **DBS Control** chapter description of the `Temporal Behavior DBS Control` field, and read the **ANSI Temporal Tables** appendix in the *Temporal Table Support* manual.

Parallel Upgrade Utility (PUT)

Use PUT to install or upgrade Teradata Database and other software, as well as install and configure the Teradata Database.

PUT is provided with each copy of this release, but you should download the latest version of PUT from <https://access.teradata.com>.

You can download the document *Parallel Upgrade Tool (PUT) Reference* from <http://www.info.teradata.com/>.

Unicode Pass Through (UPT) IUMB

Upward Compatibility

When using this feature, users who rely on the Teradata Database to screen out unsupported characters or the REPLACEMENT CHARACTER (U+FFFD) can no longer rely on Teradata to do so.

The hash function has been enhanced to handle Pass Through Characters (PTCs), including the hashing of surrogate code points (as of Unicode version 8.0). **Note:** In a future release when PTCs are fully supported, the code points may be hashed differently.

Backward Compatibility

Because this feature stores characters that were previously unsupported, PTCs on a Teradata system cannot be transported to an earlier release without replacing the PTCs.

Prior to UPT, internal Unicode to internal Unicode translations of PTCs stored a U+FFFD in the destination string. With UPT and for all sessions, including non Pass Through Sessions (PTS), the translation of PTCs stores, without loss, that same PTC in the destination string.

Prior to UPT, internal Unicode to external Unicode, such as, UTF16/UTF8 translations of PTCs, stored a U+FFFD, or EFBFBD, respectively in the destination string. With UPT and for a PTS this translation of PTCs will instead store, without loss, that same PTC in the destination string.

Upgrade and Migration

There are no issues.

Backdown

Backdown is not supported for Unicode Pass Through.

Replacing Unsupported Operating Systems

If your system runs on an unsupported OS (MP-RAS, SLES 9, SLES 10, or Windows), you must replace it with a supported version of SLES before upgrading or migrating to Teradata Database 14.10 or higher. For more information, see [Supported Software Releases and Operating Systems](#).

Note: Installation of SLES 11 changes the workload management options available on the system.

Upgrading from Older Releases

You can upgrade from Release 15.x to Release 16.10 in one step.

To upgrade from Release 14.10, perform a multi-stage upgrade process. This requires two upgrades:

- 14.10 to 15.10
- 15.10 to 16.10

All customers upgrading or migrating to Release 16.10 from Release 14.10 or higher automatically receive a copy of the necessary intermediate version(s) of Teradata Database to use during the upgrade process. Customers are licensed to use the intermediate software CD only as part of the upgrade process.

After the upgrade is complete, customers should dispose of the intermediate software CD, while retaining the Release 16.10 CD.

Contact the Teradata Support Center if you are upgrading from a version that is more than two major releases back.

About Returning to an Older Release

Although moving to a new Teradata Database release is automated, there is no automated way to reverse the process and the required conversions to move to a previous release. Backing down across a major release (xx.0), such as Release 16.0, is not supported.

System Performance

Performance Regressions

Any regressions that Teradata identifies, either by further testing or in field-deployed systems, are fixed as soon as possible. To find out the latest information about performance regressions that have been identified for the new release and how they may affect your system, see: <https://access.teradata.com>.

Use of Recoverable Network Protocol and Redrive

If Recoverable Network Protocol is enabled, the extra message communication between the client and Teradata Database may slow the performance of tactical queries.

If Redrive is also on, PJSK queries are further slowed by the overhead of creating persistent spools for response spool.

SLES 10 to SLES 11 Migration - Performance

When migrating from SLES 10 to SLES 11, the system may experience decreased performance. SLES 11 uses more CPU capacity and CPU power than SLES 10 for the same workload.

- Workloads that are CPU-bound on SLES10 may be negatively impacted on SLES11.
- The increase in CPU consumption is due largely to the new priority scheduler mechanism. Although the new priority scheduler consumes more CPU, it provides excellent benefits for tactical workload SLA control.
- The increase in CPU consumption is also due to more accurate CPU accounting in SLES 11, because it tabulates usage that was not counted in SLES 10.

Note: The new SLES11 compiler and enabling AMFS helps to reduce the performance impact.

SLES 11 offers the Completely Fair Scheduler (CFS) operating system scheduler. Leveraging this feature of SLES 11, Teradata has built the Priority Scheduler on top of the CFS to improve workload management.

Running Teradata Database with Other Applications

Other applications (including Teradata applications) may execute concurrently with the Teradata Database on approved system platforms. However, this is not encouraged as it may negatively impact the database:

- Throughput and response time performance
- Availability

It is strongly recommended that you do not run applications that are large consumers of system resources (such as other databases) concurrently without understanding the performance and availability impact to both the applications and Teradata Database.

If you do run applications on the same system or node as the Teradata Database:

- The system or node may need additional hardware (for example, memory) to support the applications.
- Monitoring and tuning the system may be more complex.
- Compromises (for example, in the settings of tuning parameters) may need to be made to provide satisfactory and consistent performance for both Teradata Database and applications.
- If a problem does occur, it may be necessary to determine whether the problem also occurs in isolation.

If an application does not run properly or interferes with Teradata Database, it may be necessary to move it to another node or system. For instance, such applications may:

- Require a different version of the operating system
- Require a different set of operating system-level patches
- Require different settings of tuning parameters
- Be unable to obtain adequate system resources, or obtain too many system resources due to the UNIX scheduler or other OS-specific resource limitations.
- Adversely affect performance
- Require significant use of the BYNET bandwidth

Reliability and availability may be a concern if an application failure tends to bring down UNIX and thereby bring down Teradata Database, or vice versa.

By default, the Teradata memory allocation algorithms are based on Teradata Database using 100% of the memory on a node. If other applications use a significant amount of node memory, you may need to add memory, and you should adjust the option controlling this percentage. For these reasons, avoid running non-Teradata applications on nodes running Teradata Database, if possible, as shown in the table that follows.

Software Type	Runs on Nodes That Run Teradata Database?	Considerations
Non-Teradata applications	No	Run on nodes that do not run Teradata Database, so that: <ul style="list-style-type: none"> • Expected throughput, expected response time, and parallel efficiency are not impacted. • Detrimental impact on the system is reduced. • Problems can be more easily isolated. • Fixes needed by one application can be made without having to apply them to nodes that do not need those fixes (or for which those fixes are detrimental).
Teradata applications and Teradata client software	Yes	Run on nodes that run Teradata Database if the software: <ul style="list-style-type: none"> • Puts a very small load on a system. • Evenly distributes the workload across the nodes. • Is used periodically for system maintenance. • Has an impact that is well-understood and acceptable.

Note: Even if applications are run on separate nodes (non-TPA nodes), they may still share the BYNET and thereby potentially interfere with Teradata Database or vice versa.

Software Maintenance Schedule

Purchasers of Teradata Database software are entitled to a period of continuing support after initial installation or upgrade.

Teradata Database Maintenance Roadmap

The Teradata Maintenance Release Roadmap shows the detailed code-level remedy and support for each Teradata Database version. The times shown for code-level remedies are defined in terms of maintenance releases. Longer periods of support may be offered depending on the schedule for subsequent releases and whether they are delayed.

Customers with active Service Agreements can find the Teradata Maintenance Release Roadmap on Teradata @ Your Service (<https://access.teradata.com>).

Customers without support agreements should contact their sales or support team.

User Documentation

Software orders include, free of charge, the following:

- PDF versions of individual user documents, and indexed user documentation collection downloadable from the Teradata Information Products website at: <http://www.info.teradata.com>.
- HTML documentation accessible from the Teradata Information Products website at: <http://www.info.teradata.com>

Documentation on IUMB is not part of the standard user documentation set. It is available to Teradata personnel at: <http://www.info.teradata.com>

Downloading a Document

To download a document for the current release from the Teradata Information Products website:

1. Go to: <http://www.info.teradata.com>
2. Select **Teradata Database**.
3. Select the desired release.
4. Select the desired document.

Reserved Words

Teradata Database reserved words cannot be used as identifiers to name host variables, correlations, local variables in stored procedures, objects (such as databases, tables, columns, or stored procedures), or parameters (such as macro or stored procedure parameters).

The new reserved words for Teradata Database 16.10 can be found in the “Restricted Words” appendix in *Release Summary*.

For instructions on how to generate the complete list of reserved words, see the “Restricted Words” appendix in *SQL Fundamentals*.

Both are available at <http://www.info.teradata.com>.

Customer Education

Teradata Customer Education delivers training for your global workforce - from scheduled public courses, customized on-site training, to the latest E-learning solutions. For more information on the latest classes, schedules, the Teradata Certification Program, and to enroll in classes online, go to the Teradata Customer Education website at:

<http://www.teradata.com/TEN/>

The representative for your region can also assist you. To find the representative for your region, use the Contact Us link at the bottom of the Teradata Education Network page.

Customer Support

Customer support is available at all hours, seven days a week. Trained professionals at a Remote Services Center (RSC) are available to assist you. To learn more about Teradata Customer Services, go to Teradata @ Your Service: <https://access.teradata.com>

If you purchased an ESS support contract, a customized support plan was created for you. Please refer to your support plan for contact information. In addition, a unique PIN (Personal Identification Number) was given to your site. If you are an ESS customer, you must contact the regional RSC to request support and you must use your PIN.

PINs are not published. If you inadvertently misplace your PIN, contact your account representative.

Technical Alerts, Knowledge Articles, and Orange Books

Customers can access technical alerts, knowledge articles, and Orange Books on Teradata @ Your Service: <https://access.teradata.com>

White Papers

White papers are executive level documents that target business or technical management, and address why a feature is valuable for an active data warehouse.

Customers can access white papers at: <http://www.teradata.com/Resources/White-Papers/>.

List of Acronyms and Abbreviations

Acronym	Definition
AMP	Access Module Processor
AWT	AMP Worker Task
BAR	Backup, Archive, and Restore
BTEQ	Basic Teradata Query Language
CLI	Call-level Interface
DSA	Teradata Data Stream Architecture (BAR tool)
GB	Gigabyte
GSS	Global Sales Support
GTW	Abbreviation for Teradata Gateway
IPE	Incremental Planning and Execution
IUM	Installation, Upgrade, and Migration
JRE	Java Runtime Environment
MAPS	Teradata Database MAPS architecture
MPP	Massively Parallel Processing
PDE	Parallel Database Extensions
PDF	Portable Document Format
PE	Parsing Engine
PUT	Parallel Upgrade Tool
RAM	Random Access Memory
SMP	Symmetric Multi-processor
SLES	SUSE Linux Enterprise Server
TeraGSS	Teradata Generic Security Services is an extension of the industry-standard GSS-API
TDGSS	Teradata Generic Security Services
TPA	Trusted Parallel Application
TVS	Teradata Virtual Storage
UDF	User-Defined Function
WAL	Write Ahead Logging